

Grades 9-12 (S)

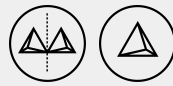
Duration: 45 min

Tools: one Logifaces Set / class

Individual work

Keywords: GeoGebra 3D,
Coordinates, Translation, Rotation,
Reflection

531 - 3D Congruence in GeoGebra



MATHS / TRANSFORMATIONS



LOGIFACES
METHODOLOGY
Erasmus+

TEACHER

Logifaces

2019-1-HU01-KA201-0612722019-1

DESCRIPTION

Students choose a block from the set and draw it in GeoGebra 3D (see exercise [527 - Coordinates in GeoGebra](#)). The task is to perform and examine the following transformations in GeoGebra.

LEVEL 1

- Draw an arbitrary vector and use the Translate by Vector Tool to translate the block by that vector.
- Draw an arbitrary line and use the Rotate around Line Tool to rotate the block around an axis, through a chosen angle.
- Draw an arbitrary plane and use the Reflect about Plane Tool to reflect the block about the plane.
- Draw a point and use the Reflect about Point Tool to reflect the block about the point.

Students can choose different vectors, lines, angles, planes and points. They can play and examine the different settings.

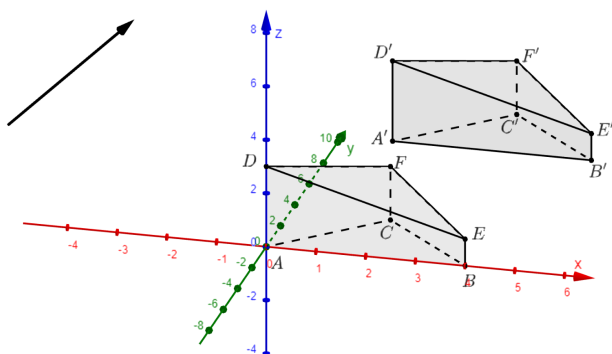
LEVEL 2 Discuss which transformations reverse the orientation and which transformations preserve the orientation.

SOLUTIONS / EXAMPLES

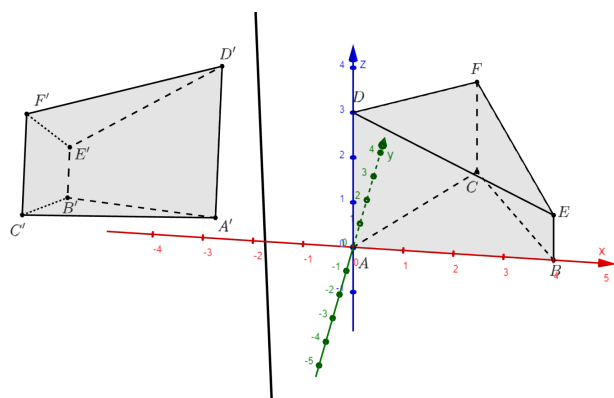
Guidelines for teachers: The difficulty of the task in Level 2 depends on which block is selected. Labelling the vertices can help students observe the orientation.

LEVEL 1 Some examples are presented in the figures below.

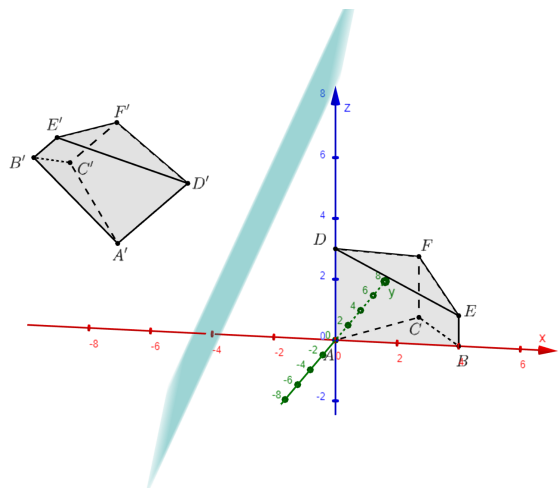
Translation by Vector:



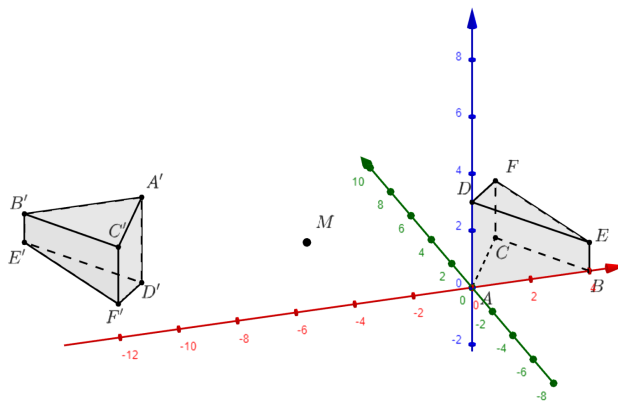
Rotation around Line:



Reflection about Plane:



Reflection about Point:



LEVEL 2

Orientation reversing transformations: reflection about a plane, reflection about a point
Orientation preserving transformations: translation, rotation around an axis

PRIOR KNOWLEDGE

Geometric transformations in 3D, GeoGebra commands

RECOMMENDATIONS / COMMENTS

Exercise [526 - Calculate the Coordinates](#) is recommended before this exercise to draw a block in GeoGebra.